



Trusted
radiation
protection.

960 Series

Digital Radiation Monitoring System (DRMS)

The 960 Series Digital Radiation Monitoring System (DRMD) is a versatile radiation instrument controller which has been widely used in nuclear power plants throughout the world. It can be used as a local control unit (LCU) on the plant floor in its NEMA 4 or NEMA 12 type housing, or rack mounted in the control room. It can also be interfaced with a supervisory computer for remote control and supervision.

The 960 Series has been qualified to meet IEEE 323 (1983) environmental and IEEE 344 (1975) seismic standards. It can also be configured to meet Nuclear Regulatory Commission (NRC) Regulatory Guide 1.75 for physical separation and fiber optic electrical isolation. The 960 firmware has been validated and verified in conformance with IEEE standard 730 (1984).

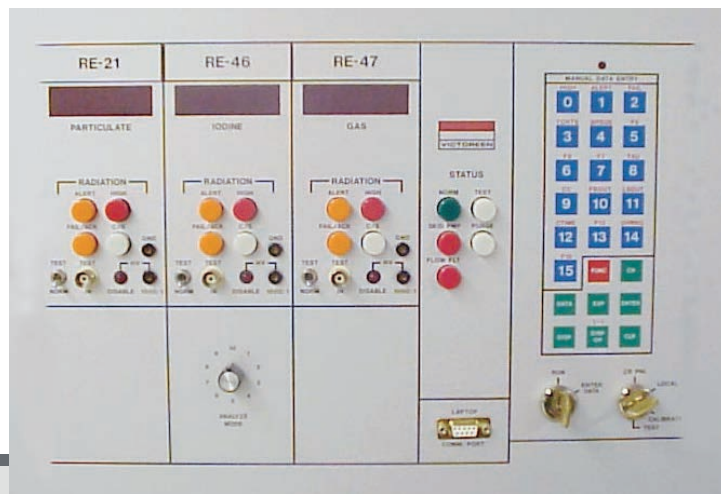
Applications

The 960 Series is highly modular to meet a wide variety of radiation instrument control needs. Each 960 Series controller consists of a wall, skid, or rack mounted enclosure containing combinations of the 960 Series modules as described in the following paragraphs.

Controller Module 960CD

The 960CD Controller is a microprocessor based module that controls other modules used in

the 960 Series. The Controller Module converts acquired data to engineering units and checks them against various setpoint levels. It also stores, displays, and transmits data. The 960CD contains two universal communication ports to communicate with a supervisory processor over redundant, polled, optically isolated loops. The 960CD can operate the 960 subsystem independently, should the supervisory computer fail.



Key features

- Digital data acquisition and control system
- Compatible with all detector/sampler assemblies
- Meets requirements of NRC Reg. Guide 1.75
- Process control capability
- Custom configuration
- IEEE 323 (1983) and IEEE 344 (1975) qualified
- Modular design
- Microprocessor based
- Analog outputs for recorder, remote display, and computer
- Fail safe DPDT relay contact outputs for warn, high, fail, and auxiliary functions



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Scaler Module 960SF

Provides the necessary interface between GM, Scintillation, or Ion Chamber radiation detectors and the 960CD Controller. It accepts up to 4 analog inputs, and provides 1 analog output. Provides detector power supply requirements.

Signal Generator Module 960SG

Provides 5 fixed frequency outputs which can be patched into the scaler to aid in troubleshooting.

Process Control Module 960RE

Provides 6 solid state relay outputs for manual or automatic control of valves and pump motors, where applicable, and accepts inputs for monitoring external conditions.

Relay Module 961RE

Provides up to 6 DPDT relay contact outputs to control external devices. Connects to the 960SF Module or the 960RE Module.

Triple Window Analyzer Module 960AN

Receives pulses from a 960SF and is capable of separating the pulses by pulse height discrimination into three different channels. By setting the proper channel window, data may be acquired and analyzed using a 960AN to determine the presence of specific nuclides, such as ¹³¹I.

Data Entry Module 960KE

In conjunction with a touch sensitive keypad, serves as a manual data entry unit for the 960CD Controller. The 960KE has provisions for entering a variety of data such as radiation alarm setpoints, background CPM value, calibration factor (k) for radiation detector, and count time.

Isolator Module 960IS

Provides isolated communication with nonclass 1E portion of the system.

Motherboard Module 960MB

Provides power and signal distribution for the other 960 modules.

American Regulator Module 960AM

Provides automatic gain stabilization for use with the 960AN analyzer module.

Dual Display Module 960DD

Provides 2 additional readout display drivers, 2 analog output circuits, 3 solid state relay driver outputs, 14 drivers for front panel indicators, and 7 switch inputs from the 960 front panel.

Specifications

Power requirements

120 V ac, 220/240 V ac option, 50/60 Hz

Dimensions (w x d x h)

- NEMA enclosure: 32 in x 18 in x 36 in (82 cm x 46 cm x 92 cm)
- Rack chassis: 19 in x 24 in x 10.5 in (48 cm x 61 cm x 27 cm)

Weight

- NEMA enclosure: up to 200 lb
- Rack chassis: up to 40 lb

Number of available modular slots

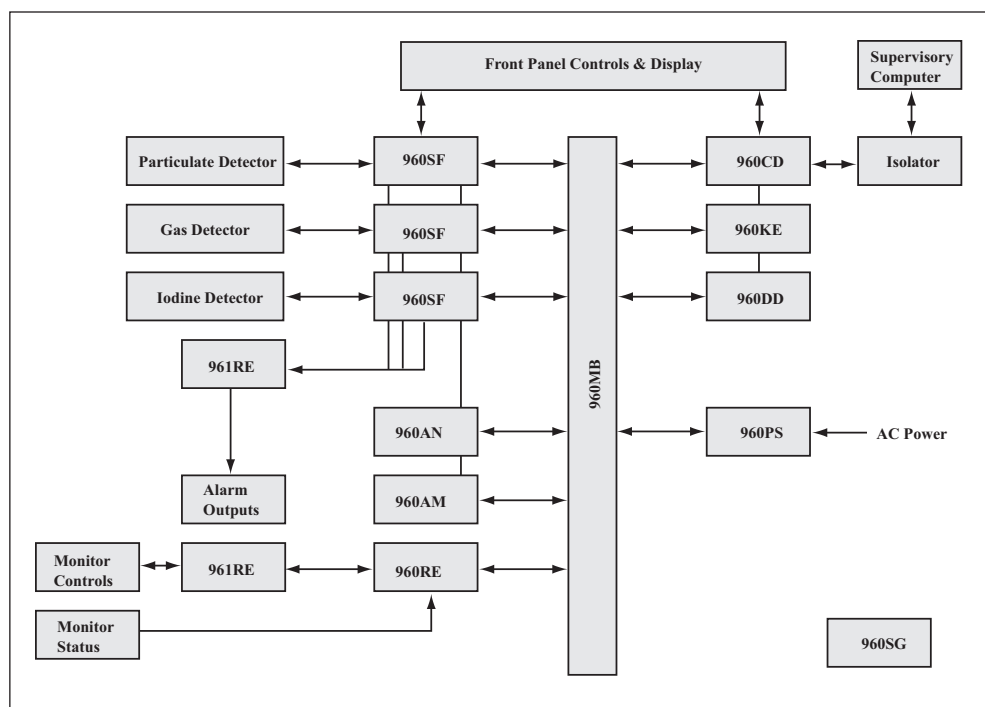
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Data entry and control

Remote display capability via computer link, and fiber optic link for class 1E application
Local control via 23 button front panel membrane switch

Inputs digital

- 8 - 120 V ac per 960RE
- 7 - switch per 960RE or 960DD



Inputs analog

Differential, 0 to 10 V dc or
4 to 20 mA dc \pm 0.1 % full scale
accuracy, 12 bit resolution,
4 per 960SF

Outputs digital

- 6 - solid state 24 V dc, 150 mA per 960RE;
- 6 - DPDT relay 120 V ac, 10 A, resistive contact per 961RE

Outputs analog

0 to 10 V dc or 4 to 20 mA,
+ 0.5 % of full scale
accuracy, 8 bit resolution, 1 per
960SF, 2 per 960DD

Display

6 Digit LED, exponential format,
1 per 960CD, 2 per 960DD.
Indicator lamps, 14 per 960DD or
960RE

Ordering information

Model

960CD: Controller Module, for use as part of the 960 Series Digital Radiation Monitoring System

960SF: Scaler Module, for use as part of the 960 Series Digital Radiation Monitoring System

960SG: Signal Generator Module, for use as part of the 960 Series Digital Radiation Monitoring System

960RE: Process Control Module, for use as part of the 960 Series Digital Radiation Monitoring System

961RE: Relay Module, for use as part of the 960 Series Digital Radiation Monitoring System

960AN: Triple Window Analyzer Module, for use as part of the 960 Series Digital Radiation Monitoring System

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960MB: Motherboard Module, for use as part of the 960 Series Digital Radiation Monitoring System

960AM: American Regulator Module, for use as part of the 960 Series Digital Radiation Monitoring System

960DD: American Regulator Module, for use as part of the 960 Series Digital Radiation Monitoring System



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